Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] I claim:

1. Apparatus for measuring the micro granulometry comprising:

1.1. Micro tube *1* in which the length is many times greater than the width and the cross-section is rectangular or circular (see *AA* on FIG. *1*). Milliliters scale *2* is marked on the face side.

1.2. Rolling holders pivoted *8.1* and held with spring *8.2*.

1.3. Sources: Gamma source *10*, Sonic source *11*.

1.4. Receivers: Gamma receiver *12*, Sonic receiver *13*.

1.5. Vertical screw *14* and rotating nut *15*.

[c2] *2*. Micro tube *1* included in apparatus in claim *1* is rectangular in cross section *AA* on FIG. *1*.

[c3] *3*. Micro tube *1* in claim *2* is made from glass or other transparent materials allowing further microscopic description and analysis (including visual analysis).

[c4] *4*. Micro tube*1* in claim *2* measures 12.5 millimeters by 150 millimeters. The total volume is 18.4 ml. The total sample volume may be as low as 5 milliliters.

[c5] *5*. Rolling holder in claim *1* pivoted *8.1* and held on the axis with spring *8.2* is a device that keeps the tube in strictly vertical position and slides it vertically while maintaining contact with the sources and the sensors.

[c6] *6*. Rolling holders are comprised of a pair of micro wheels made from rubber or plastic and connected with each other by a bar with pivot *8.1*.

[c7] *7*. The pivot *8.1* has an arm with a spring pushing the wheels to the tube; this in turn holds the tube in a strictly vertical position.

[c8] *8*. Gamma source *10* in claim *1* is a pulsing source of directional gamma rays focused into a narrow beam. This focusing is accomplished by absorbing all the rays that are not parallel to the open tube.

[c9] *9*. Gamma receiver *12* is a detector, placed at the end of a tubular lead shield. It detects only the gamma rays that are not absorbed by the sample in the test tube.

[c10] *10*. The miniature tube *28*, FIG. *4* in claim *9* is made from lead and will absorb most of the naturally occurring background gamma rays.

[c11] *11*. The pulsing source in claim *8* is depicted in Fig. *4*. It is comprised of: - Motor *25* and Axis *24* that rotate

sphere *22*. – A lead cover *20* and lead wall *21* that shield the gamma ray source.

[c12] *12*. The process for measuring the Microgranulometry. This is comprised of:

12.1. A means of placing the micro sample in the micro tube.

12.2. A means of agitating the mixture of samples with water in micro tube.

12.3. A means of measuring the properties of the sample in the tube.

12.4. A means of recording and interpreting the data.

12.5. A means of microscopic examination of the tube that contains the resulting layered aggregate.

[c13] *13*. A means of placing the micro sample in the micro tube in claim *12.1*. The means to extract a small amount of sample from the main bulk sample and disperse it in dry condition. The extracted aggregate is discharged in to the micro tube *1*.

[c14] *14*. A means of agitating the mixture of samples with water in micro tube in claim *12.2* is the process of adding water to the micro tube with sample and closing the top orifice of the micro tube with a cap. The micro tube is shaken until the sample becomes completely mixed in the water.

[c15] *15.* A means of measuring the properties of the sample in the tube in claim *12.3.* This includes a means for passing the micro tube in close proximity to the sources *10, 11* and their corresponding sensors *12, 13* so as to obtain a useful signal on an electronic measuring device. This signal is digitized and sent to the CPU.

[c16] *16.* A means of recording and interpreting the data in claim *12.4* using software that is capable of further processing the results for interpretation.

[c17] *17.* A means of microscopic examination of the tube that contains the resulting layered aggregate mentioned in claim *12.5* by viewing the side of the micro tube to describe and measure the layers in the micro tube based on its visual characteristics.